Headquarters
U.S. Army Armor Center and Fort Knox
Fort Knox, Kentucky 40121-5000
5 January 1998

Fort Knox Reg 385-5

Safety

IONIZING RADIATION PROTECTION

Summary. This regulation establishes policy and guidelines concerning the Fort Knox Ionizing Radiation Protection Program.

Applicability. These procedures apply to all elements of this installation including USAR, National Guard, Partners in Excellence and satellite units, activities, directorates, and civilian contractors. It applies to all personnel engaged in the acquisition, possession, storage, transport, disposal, and use and maintenance of ionizing radiation-producing devices, commodities and sources in the performance of their duties. (For medical use of radioactive material and equipment, refer to MEDDAC Memorandum 40-8).

Suggested Improvements. The proponent of this regulation is the Armor Branch Safety Office. Users are invited to send comments and suggested improvments on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, USAARMC and Fort Knox, ATTN: ATZK-S, Fort Knox, KY 40121-5000.

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1. PURPOSE. This regulation establishes policy and procedures for the acquisition, possession, storage, transport, disposal, and use of radioactive materials, sources, commodities, and ionizing radiation-producing devices at Fort Knox, KY.

2. REFERENCES:

a. Title 10 Code of Federal Regulations.

b. AR 385-11, 1 May 1980, Ionizing Radiation Protection.

c. AR 385-40, 1 November 1994, Accident Reporting and Records.

3. POLICY. This installation is committed to:

a. The operating philosophy of maintaining occupational radiation exposure as low as is reasonably achievable (ALARA).

b. Maintaining effective control of radioactive items to ensure that exposure to ionizing radiation and the possible release of airborne radioactive contaminants is as low as is reasonably achievable.

4. STAFF COORDINATION FOR PROGRAM. The Installation Radiation Protection Officer (IRPO) will provide overall coordination, advice, and assistance for radiological safety.

5. RESPONSIBILITIES.

a. Installation Commander. The Commander shall:

(1) Ensure that there are adequate resources to support the Radiation Protection Program to include, but not limited to, the presence of an IRPO or an Alternate RPO (ARPO) for duty during all normal duty hours.

(2) Ensure that measures are established to control health and safety hazards from ionizing radiation sources, devices, commodities, and radioactive materials.

(3) Ensure that occupational exposures are maintained within regulatory limits and comply with the ALARA principle.

(4) Designate in writing an IRPO and an ARPO.

(5) Designate members for the Installation Radiation Control Committee (IRCC).

b. Commanders (except MEDDAC), directors, and activity chiefs possessing ionizing radiation sources will:

(1) Designate in writing a Unit Radiation Protection Officer (URPO).

(2) Ensure items containing radioactive material are used solely as intended by pertinent tech bulletins, tech manuals, operator manuals, and all other written guidance to ensure personnel exposure is kept as low as reasonably achievable.

(3) Establish procedures and provide a local SOP to delineate responsibilities for the safe storage, use, identification, control, and disposal of ionizing radiation sources and material under their command/control.

(4) Maintain inventories of active and disposable radioactive materials, sources, commodities, and ionizing radiation-producing devices.

(5) Ensure storage areas comply with AR 40-5, 15 October 1990, Preventative Medicine, AR 385-11, and applicable technical publications.

(6) Submit semi-annual (January and July) inventories of ionizing radiation sources to the IRPO.

(7) Ensure that URPOs have the training, time, and resources necessary to perform their duties.

c. Commander, USA MEDDAC will:

(1) Maintain policies and procedures necessary to ensure that use of radiation and radioactive material is IAW Federal and Army regulations and any licenses or authorizations specific to the Fort Knox MEDDAC.

(2) When requested, provide medical advice and technical consultation on radiation issues.

(3) Maintain an inventory of radioactive materials and devices and provide copies to the IRPO.

(4) When requested, provide copies of the MEDDAC Radiation Safety Committee meeting minutes to the IRPO.

(5) Submit the results of U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) and Nuclear Regulatory Commission (NRC) ionizing radiation protection surveys to the IRPO.

d. G4/Director, Directorate of Logistics (G4/DOL) will:

(1) Refer requests for ionizing radiation sources to the IRPO for review.

(2) Obtain the IRPOs guidance and approval for all off-post shipments of radioactive material, commodities, and devices.

(3) Notify the IRPO immediately upon receipt of a shipment

containing radioactive materials.

(4) Ensure that vehicles (military or commercial) unloading radioactive materials at Fort Knox are not released if approval is required by the IRPO or the IRPO's representative per local SOP.

(5) Ensure that end items and components identified in TB 43-0116, 1 August 1993, Identification of Radioactive Items in the Army, and TB 43-0216, 8 October 1990, Safety and Hazard Warnings for Operation and Maintenance of TACOM Equipment, as containing radioactive material are screened and proper disposal actions taken.

(6) Ensure that G4/DOL SOP, Transfer of Radioactive Items into and within G4/DOL, is available for and followed by personnel who manage, order, dispose, handle, store, or transport radioactive sources, materials, commodities, and devices.

(7) Provide for storage space and consolidate radioactive waste. Coordinate disposal actions with the IRPO.

e. Director, Directorate of Public Works (DPW) will:

(1) Ensure technical advice and consultation on proper fire control techniques is provided to radioactive material storage providers by the fire department. The IRPO will provide information regarding the radiation hazards in particular areas and what special precautions may be necessary in regards to the material stored there.

(2) Ensure that contractors have completed and forwarded DA Form 3337, Application for DA Radiation Authorization (DARA) or Permit (DARP), to the IRPO 45 days before transporting radioactive material onto the installation.

f. Defense Reutilization and Marketing Office will notify the IRPO if material or equipment is received which is suspected of containing or contains radioactive material.

g. Director, Directorate of Contracting (DOC) will:

(1) Ensure that transporters of radioactive materials onto or off Fort Knox are knowledgeable concerning the accident reporting requirements of AR 385-40, 1 November 1994, Accident Reporting and Records, and other Federal regulations.

(2) Ensure that contractors have completed and Forwarded to the IRPO DA Form 3337, Application for DA Radiation Authorization (DARA) or Permit (DARP), 45 days before transporting radioactive material onto the installation.

(3) Ensure that license holders and license applicants (i.e. contractors or subcontractors) do not impose conditions in settlement agreements or in other agreements affecting employment that would prohibit, restrict, or discourage an employee from providing information on potential safety violations or hazards.

(4) Ensure that contractors are informed that DA permits are not required for temporary storage or use of radiation sources on the installation (not to exceed 15 consecutive calendar days). The Installation Commander's designee must approve temporary storage. Requests will be reviewed and forwarded through the IRPO.

h. Commanders disposing/transferring radioactive waste will:

(1) Notify the IRPO so that pickup can be arranged.

(2) Prepare all necessary paperwork for the transfer of items to G4/DOL.

(3) Establish handling and control procedures to preclude the unauthorized removal or salvage of radioactive material.

i. Installation Radiation Protection Officer. The IRPO will be designated in writing and will be assigned to the installation safety office. The IRPO will:

(1) Establish procedures which will ensure that the CG, USAARMC and Fort Knox, (or the appointed designee) is advised of any anticipated use of radiation sources or operations other than scheduled calibration of radiac instruments or X-ray equipment used by MEDDAC.

(2) Ensure that personnel have been instructed in safe working practices, emergency procedures, harmful biological effects of ionizing radiation, reports of defects and noncompliance, and other topics as required by Title 10, Code of Federal Regulations (CFR), Part 19 and appropriate Army regulations.

(3) Evaluate all operations involving the use or storage of radioactive materials to determine the need for restricted areas, dosimetry, or other control measures. This evaluation will include, as needed, physical measurement.

(4) Continuously review all operations involving the use or storage of radiation sources to ensure that dose rates to personnel comply with the ALARA principle.

(5) Ensure that leak tests are conducted and that radioisotope leak tests and inventory reports are submitted per this regulation on all individually controlled items.

(6) Submit Radiation Incident/Accident reports as necessary per AR 385-40.

(7) Ensure notices to workers, warning signs, instructions, and other notices required by Title 10, CFR and local SOPs are posted.

(8) Determine that all shipping arrangements for radioactive materials are per Department of Transportation (DOT) Regulations in Title 49, CFR and Title 10, CFR, Part 71. This includes, but is not limited to, packaging mode of transport, destination, location of transport vehicle, information supplied on shipping documents, labeling of packages for interim storage in warehouses and placarding of vehicles.

(9) Monitor each outgoing shipment and provide information and/or readings for shipping papers as required by Title 10, CFR, Part 71 and Title 49, CFR, Part 173, or appropriate tariffs.

(10) Monitor each incoming package received on Fort Knox containing radioactive material (except hospital packages) within 3 hours, if received during duty hours, or within 18 hours, if received after duty hours, as required by this regulation and local SOP.

(11) Monitor every vehicle or aircraft (military or commercial) that has transported radioactive materials on Fort Knox when required by this regulation and local SOP.

(12) Approve, if necessary, requests to procure radiation sources.

(13) Suspend any operation that represents a serious radiation hazard or violates applicable regulations.

(14) Monitor and advise URPOs

j. Unit Radiation Protection Officer. The URPO will:

(1) Formulate and implement the Radiation Protection Program in their unit to ensure personnel safety and regulatory compliance.

(2) Provide the commander/director and radiation workers with advice and assistance on all matters pertaining to radiation protection.

(3) Provide training and instruction to users and visitors in the safe use of protective equipment, radioactive material, radiation-producing devices, etc. All training will be documented with the trainee's signature and should be conducted annually as a minimum.

(4) Review radiological operations to determine compliance with regulations and SOPs.

(5) Ensure proper personnel monitoring devices are being utilized.

(6) Maintain dosimetry records on file per AR 40-14 and this regulation.

(7) Perform radiation surveys and leak tests or ensure that such surveys and leak tests are performed.

(8) Assist in the investigation of radiation accidents, incidents, and overexposure.

(9) Prepare ATZK-S Form 3151 for all radioactive items being transferred to G4/DOL.

(10) Comply with the provision of G4/DOL SOP for transfer of radioactive items into and within G4/DOL (Office Memorandum Number 48).

k. Supervisors of Radioactive Material. Supervisors of radioactive material or radiation-producing devices will:

(1) Maintain an inventory of radiation sources for which they are responsible. Copies will be forwarded to the URPO/IRPO.

(2) Post appropriate warning signs.

(3) Ensure personnel receive annual training and the training is documented.

(4) Comply with the ALARA principle by minimizing radioactive exposure and contamination.

(5) Secure radioactive sources from unauthorized use.

(6) Prepare, before the start of any operation involving radioactive material or possible exposure to radiation, an SOP for review by the IRPO, the Installation Safety Manager, and the IRCC. The SOP will contain as a minimum:

(a) Responsibilities

(b) Maximum Levels of Radiation (exposure and activity of source)

(c) Storage

(d) Dosimetry

(e) Fire Protection

(f) Security

(g) Decontamination Procedures

(h) Emergency Procedures

(7) Enforce SOPs, rules, and special precautions.

(8) Report to the IRPO/URPO any radiologic accident, unsafe incident, suspected overexposure or contamination, or any incident involving lost or found radiation-containing material.

6. CONTROL OF IONIZING RADIATION SOURCES.

a. No radioactive material (except hospital material) may be brought onto the installation unless it is:

(1) Incorporated in a standard issue item such as is defined in TB 43-0116, Identification of Radioactive Items in the Army Supply System, and AR 700-14, Radioactive Commodities in the DOD Supply System.

(2) Covered by a specific or general license issued by the Nuclear Regulatory Commission (NRC) to an activity on the installation or,

(3) Authorized by a Department of the Army Radioactive Material Authorization (DARA) for Army-owned quantities exempt from NRC licensing or,

(4) Included in a DA radiation permit granted for the use, storage, possession, or disposal of any source by non-Army agencies or,

(5) Authorized by the Installation Commander (temporary use or storage only) for a maximum of 15 calendar days per AR 385-11.

b. Radiation-producing devices (i.e., industrial X-ray machines etc.) must be reported to the IRPO within 5 days of arrival on the installation.

c. Inventories of all ionizing sources will be prepared by the URPO of the owning activities and forwarded to the IRPO semiannually in January and July.

d. Areas where ionizing radiation sources are stored or used must be properly secured and marked. Areas must be surveyed with a radiation meter which is marked ACTIVE and is properly calibrated to determine required precautions and applicable warning signs. This survey must be accomplished semiannually or whenever major changes are made in the quantity or type of radioactive source, the building or shielding in the area, or procedural changes for the use of the source. The IRPO will conduct and document results of surveys.

e. If warning signs are required, other documents may be required to provide information to workers, visitors, emergency rescue personnel, investigative authorities, etc. This includes, though may not be limited to:

(1) NRC Form 3.

(2) Applicable licenses

(3) Emergency procedures and SOPs

(4) Notices of noncompliance

f. Standard issue items (see AR 700-14 and TB 43-0116) containing radioactive material must be removed immediately from service when found to be broken, leaking, or unserviceable. Contact the IRPO or ARPO for removal action. Unauthorized personnel must not take apart or attempt to repair such items. Standard issue items must be used only for their intended purpose and only under proper supervision.

g. Any proposed transfer of radioactive material, sources, devices, or commodities outside the Army must be approved by the IRPO/ARPO.

h. For technical or regulatory advice and assistance, the IRPO or ARPO may be contacted at the installation safety office.

7. TRANSPORTATION OF RADIOACTIVE MATERIALS.

a. Upon receipt of a package containing radioactive material (in excess of Type A limits) the transportation officer will contact the IRPO/ARPO. The vehicle (military or commercial must be held until it is monitored and released by the IRPO/ARPO should that be determined as necessary by local SOP. Packages will be monitored within 3 hours of receipt (in excess of Type A limits) during normal duty hours and within 18 hours if received after normal duty hours. The IRPO/ARPO will monitor the package visually and with an appropriate survey meter to determine if any further action is necessary.

b. Off-post shipments must comply with regulations established by the Department of Transportation (DOT), the Nuclear Regulatory Commission (NRC), affected states, and Army regulations. The IRPO/ARPO must be consulted in the earliest stages of preparation for shipment in order to certify the package meets all regulatory requirements, packaging should be directly supervised by the IRPO/ARPO. Packages will be monitored by the IRPO/ARPO to ensure appropriate information is placed on the shipping documents.

c. Radioactive materials may be temporarily stored in connection with movement (transportation using standard procedures) as long as the following guidelines are followed.

(1) They will not be stored in the same warehouse section with explosives, flammable materials, photographic film, or unsealed food products.

(2) Packages labeled with Radioactive White I, Yellow II, or Yellow III labels will be placed in a controlled area of the warehouse.

(3) The IRPO/ARPO will be made aware of the location of any package labeled with Radioactive White I, Yellow II, or Yellow III label.

d. Standard issue items containing radioactive materials (except individual controlled items) may be moved and used anywhere, consistent with the owning activity's mission and the items intended purpose as specified in the applicable technical publications.

e. Radioactive material not included in subparagraph d above met:

(2) Movement is entirely within the installation.

f. Unsealed or leaking "sealed sources" will be moved only by the IRPO or ARPO.

8. DISPOSAL OF RADIOACTIVE WASTE.

a. When material has been determined (by radiacmeter, AMDEF, or published TBs) to be radioactive waste, the IRPO/ARPO will be notified. The following information must be provided:

(1) NSN of the items.

(2) Number of items.

(3) Nomenclature of items.

(4) Other identifying information.

(5) Whether or not the device is leaking or suspected of leaking.

(6) Serial numbers (if applicable).

(7) Actual or estimated age of the item.

(8) Radioactive isotope.

(9) Activity in millicuries or microcuries (mCI or uCI).

b. Arrangements must be made by the owning activity to drop the items from accountability so that disposal actions can be accomplished.

c. The IPRO or ARPO will provide instructions to the owning activity. Leaking sources will be picked up and moved only by the IRPO or ARPO.

d. When sufficient material has been accumulated to make disposal desirable, the IRPO will request disposal instructions from the Commander, AMCCOM.

9. EMERGENCIES. When any abnormal or emergency situation involving radioactive materials develops at Fort Knox, the IRPO or ARPO must be notified. A roster will be maintained in the staff duty officer's instruction book. The first few minutes after the discovery of a radiological accident can be the most critical if there are injuries involved. During this period, personnel present at the site must take immediate action (based on an assessment of the degree and nature of the hazard) to ensure appropriate lifesaving, control, and containment procedures are initiated.

a. Actions taken should follow roughly in the order given:

(1) Administer lifesaving first aid.

(2) Remove injured personnel from radiation area.

(3) Notify the MEDDAC ASAP that personnel have been contaminated.

(4) Keep all unnecessary personnel out of the area.

(5) Administer first aid for lesser injuries.

(6) In case of fire, clear the downwind area as far as is feasible, at least to a distance free from direct smoke inhalation.

(7) Decontaminate injured personnel as soon as possible.

(8) Do not allow any personnel, equipment etc., thought to be contaminated out of the area.

(9) Identify and record (if possible) the names of affected personnel.

(10) Any action which increases the chance of radioactive materials entering the body must be prevented. Open wounds must be cleaned (decontaminated) thoroughly, smoking, eating, and drinking will not be permitted in any area thought to be contaminated.

(11) Every attempt should be made to decontaminate individuals before they are transported to receive medical treatment.

b. The following paragraphs provide some guidance for

accomplishment of the actions above. Accurate assessments and good judgment however, must be exercised.

c. Normal first aid procedures may be used with the following exceptions, modifications, and considerations.

(1) Only those personnel with severe (i.e., life or limb endangering injuries) should be treated before removal from the immediate site of the accident. Once lifesaving procedures have been accomplished, the dangers of moving personnel from the site must be weighed against the danger of continuing radiation exposure from remaining at the site. Decontamination of injured personnel should begin as soon as possible with emphasis on removal of gross amounts of radioactive contaminants, especially from the vicinity of wounds.

(2) Personnel with minor injuries should be removed from the immediate site of the accident and decontaminated before treatment is given.

d. The priority of radiation exposure control is second only to the preservation and safety of human life and limb. Therefore, after emergency first aid has been given, all efforts will be directed towards the reduction of exposure of personnel to radiation. Towards this end, it should be remembered that ANY unnecessary radiation exposure is considered excessive. The following guidance are provided.

(1) Radiation exposure is reduced by minimizing exposure time by increasing the distance between the source of radiation and personnel and by shielding (dense materials, e.g., lead, cement, sand, plastics) between the radioactive source and personnel.

(2) All but the most severely injured personnel will be removed from the site of an accident at the earliest possible time. First aid for minor injuries should be delayed until the patient is decontaminated (if injury permits).

e. Medical personnel at the hospital/clinic and ambulance personnel must be informed ASAP of the possibility of contamination to injured personnel. Information given should be as detailed and complete as can be provided.

f. Prompt decontamination (removal of contaminants) can be accomplished in various ways. Methods selected will depend on the circumstances encountered at the site, i.e., location and concentration of contaminant on personnel, number involved, etc.

g. Actions taken to decontaminate personnel can include:

(1) Removal of clothing (most contaminants are usually on clothing and shoes).

(2) Thorough washing with nonabrasive soap and lukewarm water. Avoid the use of organic solvents, they increase the probability of radioactive materials penetrating through the pores of the skin.

(3) Localized contaminated areas should be marked off and cleansed with swabs to minimize the danger of spreading contaminants by general washing.

(4) Showering under tepid water using a mild soap solution in the event contamination is not localized or several individuals have been contaminated.

h. All materials used in the decontamination of personnel will be treated, handled, and disposed of as low level radioactive waste under the supervision of the IRPO/ARPO.

i. If there has been a fire or if airborne release of radioactive contaminants is suspected, nose wipes will be taken from all personnel in the immediate vicinity of the accident before they are released from the site. Wipes will be protected from cross contamination and will be identified, as a minimum, with the name, SSN, unit, and telephone number of the individual.

j. In any case, the name, SSN, address, unit, and telephone number (as applicable) will be obtained from each individual involved.

k. Proper control and containment of radioactive contamination assists in minimizing personnel exposure and in the eventual task of area decontamination.

(1) Take all possible steps to isolate and close off the accident site to include sealing all windows and doorways, shutting down ventilation systems, and limiting access to authorized personnel only (i.e., emergency response team members, fire fighters, military police, medical personnel).

(2) If fire is involved, extinguish (if possible) as quickly as possible. Take precautions to prevent water run-off from leaving the area.

(3) Contain and isolate all contaminated or possibly contaminated personnel and equipment until decontamination and monitoring operations are complete.

(4) If it is essential (loss of life or limb) to remove any individual or piece of equipment from the scene before decontamination is complete, take all prudent precautions to prevent the cross-contamination of otherwise uncontaminated personnel, areas, equipment, and vehicles.

(5) Suspect that everyone and everything involved with the accident is contaminated (worst case scenario) until it is shown by monitoring to be otherwise.

l. The Installation RPO will advise the fire department of areas used to store radioactive material and the particular hazards associated with each area.

(1) Radioactive materials will be stored strictly per published technical data to ensure prevention of any significant external dose under any conditions. Fire fighters should wear self-contained breathing apparatus and protective clothing while fighting fires that possibly involve radioactive materials.

(2) The IPRO will be informed of any fire involving an area where radioactive material is stored.

10. PROCEDURES FOR CONTROL OF STORAGE AREAS. The IRPO will evaluate all storage areas semiannually per local SOP.

11. PROCEDURES FOR CONTROL OF THE CALIBRATION POINT. The Calibration Point will ensure a comprehensive SOP is written and available for personnel who control, store, use, and dispose of INDIVIDUALLY CONTROLLED radioactive items.

12. REPORT OF SAFETY HAZARDS. a. Code of Federal Regulations (CFR) Title 10, Part 21 requires that any manufacturing defect involving any device licensed by the NRC must be reported within 2 days following receipt of the information. Failure to comply may result in civil penalties assessed in the amount provided by Section 234 of the Atomic Energy Act of 1954, as amended. DA personnel are NOT exempt from this requirement.

b. Any individual discovering or having knowledge of an ionizing radiation safety hazard must report such knowledge to the IRPO or ARPO in an expeditious and timely manner. Possible safety hazards include, but are not limited to:

(1) Release of unauthorized amounts of radioactivity to an unrestricted area (the environment). Action such as incinerating, crushing, throwing in dumpsters, etc., of radioactive material (with some minor exceptions) is strictly prohibited by law.

(2) Unauthorized disassembly of a radioactive component.

(3) Leaking "sealed" source.

(4) Overexposure or suspected overexposure of personnel.

(5) Loss of control of radioactive items.

(6) Dose rates in UNRESTRICTED areas in excess of 0.5 millirem per hour.

(7) Failure to use individually controlled radioactive items strictly in accordance with applicable technical publications.

c. The IRPO will evaluate the information, investigate if necessary, and determine if the accident/incident should be reported as a "Substantial Safety Hazard" IAW Title 10 CFR, Part 21.

FOR THE COMMANDER:

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